

CLAIMS:

1. A method of processing internal operations in a network switch, said method comprising the steps of:

constructing a lookup table in system memory, by snooping a communication channel in a network switch for lookup table information, and, upon detection of lookup table information on said communication channel, transmitting the lookup table information to a remote system memory, thereby constructing a lookup table in the remote system memory; and

processing DMA operations by providing a DMA descriptor including a reload field therein, processing the DMA descriptor, and identifying a location of a next DMA descriptor based upon a condition of the reload field, wherein the lookup table in remote system memory enables CPU access to the lookup table without requiring communication on the communication channel, and wherein the condition of the reload field enables flexible DMA descriptor handling.

2. The method as recited in claim 1, wherein the lookup information includes at least one of lookup table insert messages and lookup table delete messages.

3. A method as recited in claim 1, wherein, if said reload field is set to a first condition, the next DMA descriptor is located in a next sequential address location.

4. A method as recited in claim 1, said method comprising a step of addressing the lookup table via a CPU.

5. A method as recited in claim 1, wherein when said reload field is set to a second condition, a next DMA descriptor location is determined based upon information contained in a predetermined location.

6. A method as recited in claim 1, wherein said system memory is dedicated for CPU operation.

7. A method as recited in claim 1, wherein said lookup information synchronizes a plurality of lookup tables within the network switch, and wherein transmitting of the lookup table information to the remote system

15. A method as recited in claim 8, wherein said lookup information synchronizes a plurality of lookup tables within the network switch, and wherein transmitting of the lookup table information to the remote system

22. A method as recited in claim 17, wherein the step of storing port activity data comprises storing the port activity data in a plurality of statistics

23. A method of processing packets in a network switch, said method comprising the steps of:

processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag; and

constructing an address lookup table for the network switch in a system memory, said method of constructing the address lookup table comprising the steps of snooping a communication channel in a network switch of said stack of network switches, for address lookup table information being communicated thereupon, and upon detection of address lookup table information on said communication channel, transmitting the address lookup table information to a remote system memory, thereby constructing an address lookup table in the remote system memory;

24. A method as recited in claim 23, wherein said stack-specific tag includes information relating to at least one of stack count, trunk group information, and mirroring information.

25. A method as recited in claim 23, wherein the processing step further comprises forwarding the packet to a mirroring port in accordance with mirroring information in the stack-specific tag.

26. A method as recited in claim 25, wherein the step of forwarding to the mirroring port includes a step of selectively forwarding the packet to a destination port in accordance with the mirroring information.

27. A method as recited in claim 26, wherein the mirroring information includes a first field containing a mirroring indicator and a second field including a destination indicator indicating whether the packet is to be sent to the destination port.

28. A method as recited in claim 23, wherein the processing step further comprises processing trunk group information in the stack-specific tag, said trunk group information controlling port selection among network switches in the stack.

29. A method as recited in claim 28, wherein the processing step processes information relating to a trunk group associated with a source port.

30. A method as recited in claim 28, wherein the processing step processes information relating to a trunk group associated with a destination port.

31. A method as recited in claim 28, wherein said processing step includes processing information in the stack-specific tag regarding whether one of a source port and a destination port is part of a trunk group, and information regarding selecting communication ports associated with the trunk group.

32. A method as recited in claim 31, wherein said processing step further comprises processing information regarding selected communication ports associated with trunk groups including specific trunk information and specific trunk port selection information.

33. A method as recited in claim 23, wherein said address lookup information includes at least one of address lookup table insert messages and address lookup table delete messages.

34. A method as recited in claim 23, said method further comprising a step of accessing the address lookup table via a CPU, to search for a selected address.

35. A method as recited in claim 23, wherein said system memory is dedicated for CPU operation.

36. A method as recited in claim 23, wherein said address lookup table information synchronizes a plurality of address lookup tables within the network switch, and wherein transmitting the address lookup table information to the remote system memory synchronizes the address lookup table in the remote system memory with the plurality of address tables.

37. A method of processing packets in a network switch, said method comprising the steps of:

inserting a stack-specific tag into a packet;

processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag; and

removing the stack-specific tag from the packet;

constructing an address lookup table for the network switch in a system memory, said method of constructing the address lookup table comprising the steps of snooping a communication channel in a network switch of said stack of network switches, for address lookup table information being communicated thereupon, and upon detection of address lookup table information on said communication channel, transmitting the address lookup table information to a remote system memory, thereby constructing an address lookup table in the remote system memory; and

monitoring port activity in the network switch, by storing port activity data in a statistics register on a network switch, reading the port activity data with a statistics gathering unit, transmitting the port activity data directly to a remote system memory, thereby reconstructing the statistics register in the remote system memory, and then accessing the remote system memory with a remote CPU to read the reconstructed statistics register.

38. A method as recited in claim 37, wherein the lookup table information includes at least one of lookup table insert message and lookup table delete messages.

39. A method as recited in claim 37, wherein the port activity data is transmitted via a DMA operation.

40. A method as recited in claim 37, said method comprising a step of accessing the lookup table via a CPU, to search for a selected address.

41. A method as recited in claim 37, said method further comprising a step of repeatedly reading the port activity data and transmitting the port activity data at predetermined intervals.

42. A method as recited in claim 37, wherein said system memory is dedicated for CPU operation.

43. A method as recited in claim 37, wherein said predetermined interval is a predetermined number of system clock cycles.

44. A method as recited in claim 37, wherein said lookup information synchronizes a plurality of lookup tables within the network switch, and wherein transmitting of the lookup table information to the remote system memory synchronizes the lookup table in the remote system memory with the plurality of lookup tables.

45. A method as recited in claim 37, wherein storing the port activity data comprises storing the port activity data in a plurality of statistics registers on a network switch, wherein the port activity data is transmitted to the remote system memory to thereby reconstruct the plurality of statistics registers in the remote system memory, and wherein the remote CPU accesses the remote system memory to read selected ones of the plurality of statistics registers.

46. A method of processing packets in a network switch, said method comprising the steps of:

inserting a stack-specific tag into a packet;

processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag; and

removing the stack-specific tag from the packet;

monitoring port activity in the network switch, by storing port activity data in a statistics register on the network switch, reading the port activity data with a statistics gathering unit, transmitting the port activity data directly to a remote system memory, thereby reconstructing the statistics register in the remote system memory, and accessing the remote system memory with a

snoop logic connected to a remote system memory, said snoop logic also being connected to the internal communication channel to detect lookup

a DMA processing unit for processing said DMA descriptor information, said DMA processing unit identifying a location of a next DMA descriptor based upon a condition of the reload field, said DMA unit and said DMA processing unit enabling efficient access to said remote system memory.

snoop logic connected to a remote system memory, said snoop logic also being connected to the internal communication channel to detect lookup table information being transmitted on said channel, and transmit said lookup table information to said remote system memory, wherein said snoop logic creates a duplicate lookup table in said remote system memory for direct memory access by a remote CPU;

a statistics counter connected to said data port for monitoring operational parameters associated with the data port, said statistics counter including statistics registers therein; and

a statistics gathering circuit connected to said statistics counter for reading the statistics registers and for directly transmitting data from the statistics registers to the remote system memory.

a data port for communicating with a data network;

a statistics counter connected to said data port for monitoring operational parameters associated with the data port, said statistics counter including statistics registers therein;

a statistics gathering circuit connected to said statistics counter for reading the statistics registers and for directly transmitting data from the statistics registers to a remote system memory;

a DMA unit containing DMA descriptor information therein, said DMA descriptor information including a reload field; and

a DMA processing unit for processing said DMA descriptor information, said processing unit identifying a location of a next DMA descriptor based upon a condition of the reload field, said DMA unit and said DMA processing unit working in conjunction with the remote system memory.

56. A network switch, comprising:

a tag insertion unit for inserting a stack specific tag into a packet;

a processing unit for processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag;

a removing unit for removing the stack-specific tag from the packet when the packet is being switched to a destination port;

at least one lookup table, said lookup table being constructed based upon lookup messages transmitted over an internal communication channel in said network switch;

snoop logic connected to a remote system memory, said snoop logic also being connected to the internal communication channel to detect lookup table information being transmitted on said channel, and transmit said lookup table information to said remote system memory, wherein said snoop logic creates a duplicate lookup table in said remote system memory for direct memory access by a remote CPU;

a DMA unit containing DMA descriptor information therein, said DMA descriptor information including a reload field; and

a DMA processing unit for processing said DMA descriptor information, said processing unit identifying a location of a next DMA descriptor based

57. A network switch, comprising:

- a tag insertion unit for inserting a stack specific tag into a packet;
- a processing unit for processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag;
- a removing unit for removing the stack-specific tag from the packet when the packet is being switched to a destination port;
- at least one lookup table therein, said lookup table being constructed based upon lookup messages transmitted over an internal communication channel;

a data port for communicating with a data network;
a statistics counter connected to said data port for monitoring operational parameters associated with the data port, said statistics counter including statistics registers therein; and

58. A network switch, comprising:

- a tag insertion unit for inserting a stack specific tag into a packet;
- a processing unit for processing the packet in a stack of network switches in accordance with tag information in the stack-specific tag;
- a removing unit for removing the stack-specific tag from the packet when the packet is being switched to a destination port;
- a data port for communicating with a data network;

a DMA processing unit for processing said DMA descriptor information, said processing unit identifying a location of a next DMA descriptor based upon a condition of the reload field, said DMA unit and said DMA processing unit working in conjunction with the remote system memory.